

Appl. No. : 09/938,804  
Filed : August 24, 2001

### AMENDMENTS TO THE CLAIMS

Please amend the claims as follows.

1. **(Currently amended)** A method for improving optical recognition of text in an electronic bitmap including non-white pixels and white pixels through preprocessing of the bitmap in a computer, the method comprising:

- a) receiving the bitmap;
- b) locating one or more bytes having no non-white pixels in the received bitmap, wherein the locating identifies at least one a gap in a character stroke, wherein the gap in a character stroke is not a hole surrounded by the character stroke;
- c) inserting bytes having non-white pixels into a series of bytes having no non-white pixels such that at least a portion of the identified gap is eliminated; and
- d) optically recognizing the bitmap for a predefined class of text characters;
- e) establishing a layout of the bitmap as a matrix of bytes, the matrix having columns and rows;
- f) identifying a series of bytes along the column having no non-white pixels;
- g) counting the number of bytes in the series of bytes;
- h) determining whether the number exceeds a predefined maximum value; and
- i) replacing each of the series of bytes with one of the bytes bounding the series of bytes when the predefined maximum value is not exceeded.

2. **(Currently amended)** The method of Claim 1, wherein the inserting of bytes having non-white pixels into a series of bytes having no non-white pixels eliminates at least a portion of the identified gap further comprising:

- e) establishing a layout of the bitmap as a matrix of bytes, the matrix having columns and rows;
- f) identifying a series of bytes along the column having no non-white pixels;
- g) counting the number of bytes in the series of bytes;
- h) determining whether the number exceeds a predefined maximum value; and

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i) replacing each of the series of bytes with one of the bytes bounding the series of bytes when the predefined maximum value is not exceeded.

3. (Currently amended) The method of Claim 12, further comprising repeating f) to i) for the entire column and for all the columns of the matrix.

4. (Currently amended) The method of Claim 1, A method for improving optical recognition of text in an electronic bitmap including non-white pixels and white pixels through preprocessing of the bitmap in a computer, the method comprising:

- a) receiving the bitmap;
- b) locating one or more bytes having no non-white pixels in the received bitmap,  
wherein the locating identifies a gap in a character stroke;
- c) inserting bytes having non-white pixels into a series of bytes having no non-white pixels,

wherein locating one or more bytes having no non-white pixels comprises  
includes reading a series of bytes in the bitmap.

5. (Original) A method for improving optical recognition of text in an electronic bitmap including white pixels and non-white pixels through preprocessing of the bitmap in a computer environment, the method comprising:

- receiving the bitmap;
- reading a series of bytes in the bitmap;
- identifying in the read series at least one vertically adjacent byte containing all white pixels vertically bounded by bytes containing at least one black pixel;
- counting the number of the at least one vertically adjacent byte containing all white pixels;
- reading at least one of the bounding bytes and writing the read bounding byte to each of the at least one byte containing all white pixels when the number does not exceed a predefined maximum value; and

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optically recognizing the bitmap for a predefined class of text characters.

6. (Original) The method of Claim 5, wherein the non-white pixels are black pixels in a black and white bitmap.

7. (Original) The method of Claim 5, further comprising reading each byte in vertical succession for each byte-length column of bytes in the bitmap until the vertical and horizontal boundaries of the bitmap have been reached.

8. (Original) The method of Claim 5, wherein the bitmap is optically recognized using optical character recognition (OCR).

9. (Original) The method of Claim 5, wherein the bitmap is optically recognized using intelligent character recognition (ICR).

10. (Original) A method for improving optical recognition of text in an electronic bitmap including white pixels and non-white pixels through preprocessing of the bitmap in a computing environment, the method comprising:

receiving the bitmap;

reading a series of bits in the bitmap;

identifying in the series of bits at least one vertically adjacent white pixel bounded vertically by non-white pixels;

counting the number of the at least one vertically adjacent white pixel;

writing a non-white pixel to each of the at least one vertically adjacent white pixel when the number does not exceed the predefined maximum value; and

optically recognizing the bitmap for a predefined class of text characters.

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11. (Original) The method of Claim 10, further comprising reading each bit in vertical succession for each horizontal position of the bitmap until the vertical and horizontal boundaries of the bitmap have been reached.

12. (Original) A method for improving optical recognition of text in an electronic bitmap including white pixels and non-white pixels through preprocessing of the bitmap in a computer environment, the method comprising:

- receiving the bitmap;
- reading a subject bit in the bitmap;
- reading a right bit and a left bit, the right bit and the left bit being horizontally adjacent to the subject bit;
- grouping the right bit, left bit and the subject bit into a combination bit group;
- identifying at least one vertically adjacent combination bit group having all white pixels vertically bounded by combination bit groups containing at least one non-white pixel;
- counting the number of the at least one vertically adjacent combination bit group;
- reading at least one of the combination bit groups containing at least one non-white pixel and writing the read combination bit group to each of the at least one combination bit group containing all white pixels when the number does not exceed the predefined maximum value; and
- optically recognizing the bitmap for a predefined class of text characters.

13. (Original) The method of Claim 12, further comprising reading in vertical succession each combination bit group in each three-bit length column of the bitmap until the vertical and horizontal boundaries of the bitmap have been reached.

14. (Original) The method of Claim 13, wherein the three-bit length column includes a present column and a previous column, and wherein the reading of the combination bit group in vertical succession in the present column includes reading of the previous column's subject bit

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and right bit and wherein the subject bit in the previous column is the left bit in the present column and the right bit in the previous column is the subject bit in the present column.

15-21. (Cancelled).

22. (Currently amended) The method of Claim 21 A method of improving optical recognition of text in an electronic bitmap including non-white pixels and white pixels through preprocessing of the bitmap in a computing environment, the method comprising:

- a) receiving the bitmap;
- b) performing a contiguity analysis of the bitmap, wherein the contiguity analysis identifies at least one gap in a character stroke;
- c) performing selective placement of non-white pixels into the bitmap so as to increase contiguity; and
- d) optically recognizing the bitmap for a predefined class of text characters, wherein the contiguity analysis identifies a vertical gap in image data between two image objects, each image object being located at the same horizontal position on the bitmap as the gap, and
  - wherein the gap is measured to determine if the vertical distance of the gap is within a predetermined maximum value.

23. (Original) The method of Claim 22, wherein a vertically positioned gap not exceeding the predetermined maximum value is determined to be a break in a character stroke.

24. (Currently amended) The method of Claim 22, wherein the bitmap, arranged as columns and rows, is processed along each column in succession.

25-28. (Cancelled).

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29. (Previously presented) The method of Claim 1, wherein each byte comprises eight bits and wherein each bit is displayed as a unique pixel.

30. (Previously presented) The method of Claim 1, wherein inserting bytes having non-white pixels into a series of bytes having no non-white pixels comprises eliminating at least a portion of the identified gap in a character stroke.

31. (Previously presented) The method of Claim 1, wherein the received bitmap comprises a plurality of bytes and wherein the locating of bytes having no non-white pixels comprises comparing vertically adjacent ones of the bytes of the bitmap.

32. (**Currently amended**) The method of Claim 1, wherein the gaps in a character strokes are is a vertical gaps.

33-35. (**Cancelled**).

36. (Previously presented) A method of improving optical recognition of text in an electronic bitmap including non-white pixels and white pixels through preprocessing of the bitmap in a computing environment, the method comprising:

- a) receiving the bitmap;
- b) performing a contiguity analysis of the bitmap, wherein the contiguity analysis identifies gaps in character strokes, and wherein the contiguity analysis identifies a vertical gap in image data between two image objects, each image object being located at the same horizontal position on the bitmap as the gap, wherein the gap is measured to determine if the vertical distance of the gap is within a predetermined maximum value;
- c) performing selective placement of non-white pixels into the bitmap so as to increase contiguity; and
- d) optically recognizing the bitmap for a predefined class of text characters.

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37. (New) The method of Claim 22, wherein the performing of selective placement of non-white pixels into the bitmap eliminates at least a portion of the identified gap and thereby increase contiguity.